

FDP090N10 N-Channel PowerTrench[®] MOSFET 100 V, 75 A, 9 mΩ

Features

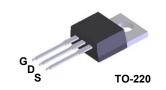
- $R_{DS(on)}$ = 7.2 m Ω (Typ.) @ V_{GS} = 10 V, I_D = 75 A
- · Fast Switching Speed
- · Low Gate Charge
- High Performance Trench Technology for Extremely Low $R_{\text{DS}(\text{on})}$
- High Power and Current Handling Capability
- RoHS Compliant

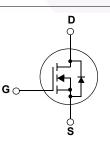
General Description

This N-Channel MOSFET is produced using Fairchild Semiconductor $^{\textcircled{B}}$ s advanced Power Trench $^{\textcircled{B}}$ process that has been tailored to minimize the on-state resistance while maintaining superior switching performance.

Applications

- Synchronous Rectification for ATX / Server / Telecom PSU
- Battery Protection Circuit
- · Motor Drives and Uninterruptible Power Supplies
- Micro Solar Inverter





MOSFET Maximum Ratings T_C = 25°C unless otherwise noted*

Symbol		FDP090N10	Unit		
V _{DSS}	Drain to Source Voltage	100	V		
V _{GSS}	Gate to Source Voltage		±20	V	
I _D	Drain Current	-Continuous (T _C = 85 ^o C)		75	Α
I _{DM}	Drain Current	- Pulsed	(Note 1)	300	A
E _{AS}	Single Pulsed Avalanche Energy			309	mJ
I _{AR}	Avalanche Current		(Note 1)	75	A
E _{AR}	Repetitive Avalanche Ener	ду	(Note 1)	20.8	mJ
dv/dt	Peak Diode Recovery dv/d	t	(Note 3)	5.6	V/ns
P _D	David Dissingtion	(T _C = 25°C)		208	W
	Power Dissipation	- Derate above 25°C		1.39	W/ºC
T _J , T _{STG}	Operating and Storage Temperature Range			-55 to +175	°C
TL	Maximum Lead Temperatu 1/8" from Case for 5 Secor	300	°C		

Thermal Characteristics

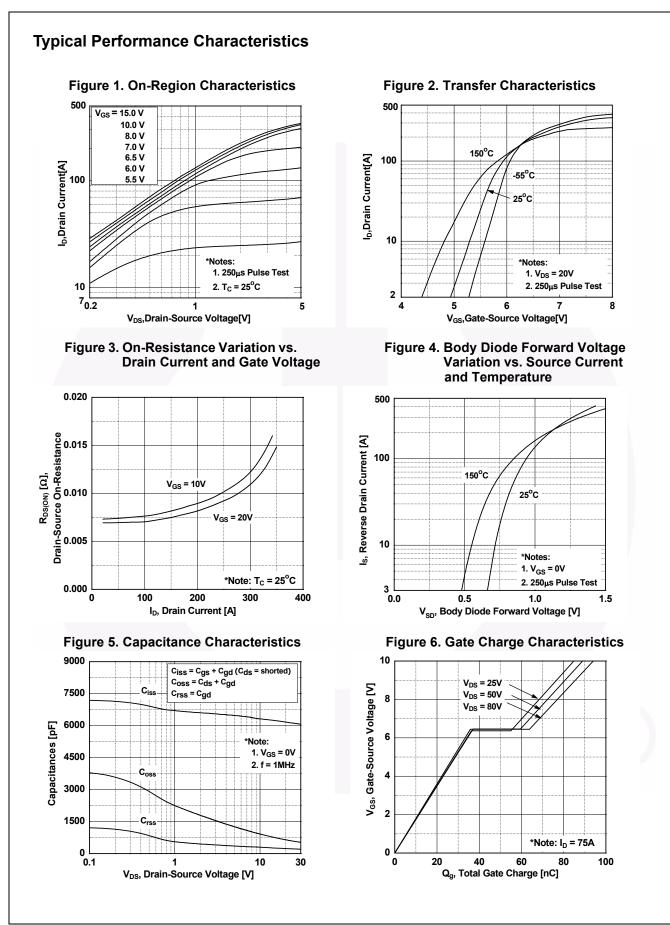
Symbol	Parameter	FDP090N10	Unit
$R_{ ext{ heta}JC}$	Thermal Resistance, Junction to Case, Max.	0.72	
$R_{\theta CS}$	Thermal Resistance, Case to Sink Typ.	0.5	°C/W
R_{\thetaJA}	Thermal Resistance, Junction to Ambient, Max.	62.5	

July 2013

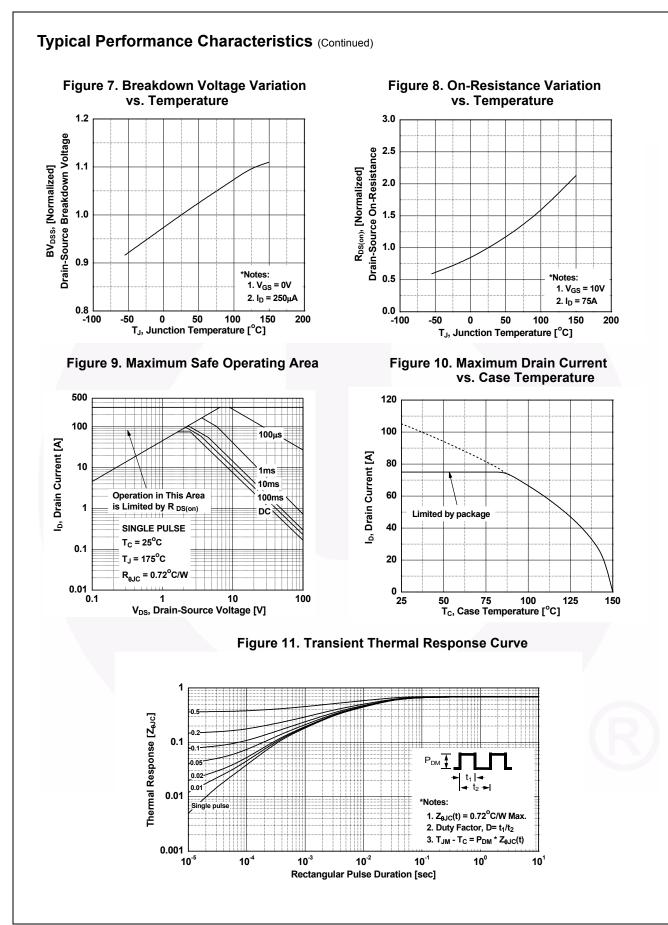
Device Marking		Device	Pack	age	Reel Size	el Size Tap			Quantity	
FDP09	-		TO-2	-220 -		-		50		
Electrica	al Char	acteristics								
Symbol		Parameter			Test Conditions	;	Min.	Тур.	Max.	Unit
Off Chara	cteristic	e.							1	
BV _{DSS}			/oltage	1_ = 2	250μ V = 0 V T	= 25 ⁰ C	100	_	_	V
∆BV _{DSS}	Drain to Source Breakdown Voltage		-	$I_D = 250 \mu A, V_{GS} = 0V, T_C = 25^{\circ}C$			100	-	-	
ΔT_{J}		Breakdown Voltage Temperature Coefficient		$I_D = 250 \mu A$, Referenced to $25^{\circ}C$			-	0.1	-	V/°C
				V _{DS} = 100V, V _{GS} = 0V			-	-	1	
I _{DSS}	Zero G	Zero Gate Voltage Drain Current		$V_{DS} = 100V, V_{GS} = 0V, T_C = 150^{\circ}C$			-	-	500	μA
I _{GSS}	Gate to	Body Leakage Currer	nt		= ±20V, V _{DS} = 0V		-	-	±100	nA
On Chara	ctoristic	c								1
		hreshold Voltage		Vcs	= V _{DS} , I _D = 250μA		2.5	3.5	4.5	V
Vacuus		noonola voltago		•65						-
		rain to Source On Re	sistance	Vcs	= 10V In = 75A		-	12	9	1 111(2)
R _{DS(on)} 9 _{FS}	Static E Forwar	Drain to Source On Re d Transconductance	sistance		= 10V, I _D = 75A = 10V, I _D = 37.5A		-	7.2 100	9	S
R _{DS(on)} g _{FS} Dynamic (C _{iss}	Static E Forwar Characte Input C	d Transconductance	sistance	V _{DS} :	= 10V, I _D = 37.5A = 25V, V _{GS} = 0V				9 - 8225 775	
R _{DS(on)} 9FS Dynamic C _{iss}	Static E Forwar Characte Input C Output	d Transconductance eristics apacitance		V _{DS} :	= 10V, I _D = 37.5A = 25V, V _{GS} = 0V		-	100 6185	- 8225	pF
R _{DS(on)} 9FS Dynamic (C _{iss} C _{oss} C _{rss}	Static E Forwar Characte Input C Output Reverse	d Transconductance eristics apacitance Capacitance e Transfer Capacitanc		V _{DS} :	= 10V, I _D = 37.5A = 25V, V _{GS} = 0V		-	100 6185 585	- 8225 775	S pF pF
R _{DS(on)} 9FS Dynamic (C _{iss} C _{oss} C _{rss} Switching	Static E Forwar Characto Input C Output Reverso Charac	d Transconductance eristics apacitance Capacitance e Transfer Capacitanc teristics		V _{DS} :	= 10V, I _D = 37.5A = 25V, V _{GS} = 0V		-	100 6185 585	- 8225 775	S pF pF
R _{DS(on)} 9FS Dynamic C _{iss} C _{oss} C _{rss} Switching	Static E Forwar Characte Input C Output Reverse Charac Turn-Or	d Transconductance eristics apacitance Capacitance e Transfer Capacitanc		V _{DS} =	= 10V, I _D = 37.5A = 25V, V _{GS} = 0V		-	100 6185 585 235	- 8225 775 355	S pF pF
R _{DS(on)} 9FS Dynamic C _{iss} C _{oss} C _{rss} Switching t _{d(on)} t _r	Static E Forwar Characte Input C Output Reverse Charac Turn-Or Turn-Or	d Transconductance eristics apacitance Capacitance e Transfer Capacitanc teristics n Delay Time		V _{DS} =	= 10V, I _D = 37.5A = 25V, V _{GS} = 0V MHz			100 6185 585 235 107	- 8225 775 355 224	S pF pF pF ns
R _{DS(on)} 9FS Dynamic C _{iss} C _{oss} C _{rss} Switching t _{d(on)} t _r t _{d(off)}	Static E Forwar Characte Input C Output Reverse Charac Turn-On Turn-On Turn-On Turn-On	d Transconductance eristics apacitance Capacitance e Transfer Capacitanc teristics n Delay Time n Rise Time		V _{DS} =	= 10V, I _D = 37.5A = 25V, V _{GS} = 0V MHz = 50V, I _D = 75A	(Note 4)	-	100 6185 585 235 107 322	- 8225 775 355 224 655	S pF pF pF ns ns
$\begin{array}{c} R_{DS(on)} \\ \hline g_{FS} \\ \hline Dynamic \\ \hline C_{iss} \\ \hline C_{oss} \\ \hline C_{rss} \\ \hline \\ Switching \\ \hline t_{d(on)} \\ \hline t_r \\ \hline t_{d(off)} \\ \hline t_f \\ \hline \end{array}$	Static E Forwar Characte Input C Output Reverse g Charac Turn-Or Turn-Or Turn-Of Turn-Of	d Transconductance eristics apacitance Capacitance e Transfer Capacitanc teristics n Delay Time n Rise Time f Delay Time		V _{DS} =	= 10V, I _D = 37.5A = 25V, V _{GS} = 0V MHz = 50V, I _D = 75A	(Note 4)	- - - - - -	100 6185 585 235 107 322 166	- 8225 775 355 224 655 342	S pF pF pF ns ns ns
$\begin{array}{c} R_{DS(on)} \\ \hline g_{FS} \\ \hline Dynamic \\ \hline C_{iss} \\ \hline C_{oss} \\ \hline C_{rss} \\ \hline C_{rss} \\ \hline \\ \hline c_{iss} \\ \hline \\ c_{iss} \\ c$	Static E Forwar Characto Input C Output Reverso Charac Turn-Or Turn-Or Turn-Of Turn-Of Total Ga	d Transconductance eristics apacitance Capacitance e Transfer Capacitanc teristics n Delay Time n Rise Time f Delay Time f Delay Time f Fall Time		V _{DS} = V _{DS} = f = 11 V _{DD} = V _{GS} = V _{DS} = V _{DS} = V _{DS} = V _{DS} = V _{DS} = V _{DS} = (1)	= 10V, I _D = 37.5A = 25V, V _{GS} = 0V MHz = 50V, I _D = 75A = 10V, R _{GEN} = 25Ω = 50V, I _D = 75A	(Note 4)	· · · ·	100 6185 585 235 107 322 166 149	- 8225 775 355 224 655 342 309	S pF pF pF ns ns ns ns
$\begin{array}{c} V_{GS(th)} \\ \hline R_{DS(on)} \\ \hline g_{FS} \\ \hline \textbf{Dynamic} \\ \hline \textbf{C}_{iss} \\ \hline \textbf{C}_{oss} \\ \hline \textbf{C}_{rss} \\ \hline \textbf{Switching} \\ \hline \textbf{t}_{d(on)} \\ \hline \textbf{t}_{r} \\ \hline \textbf{t}_{d(off)} \\ \hline \textbf{t}_{f} \\ \hline \textbf{Q}_{g(tot)} \\ \hline \textbf{Q}_{gg} \\ \hline \textbf{Q}_{gd} \\ \end{array}$	Static E Forwar Characte Input C Output Reverse Charac Turn-Or Turn-Or Turn-Of Turn-Of Turn-Of Turn-Of Turn-Of Turn-Of Turn-Of Charac	d Transconductance eristics apacitance capacitance e Transfer Capacitanc teristics n Delay Time n Rise Time f Delay Time f Delay Time f Fall Time ate Charge at 10V		V _{DS} = V _{DS} = f = 11 V _{DD} = V _{GS} = V _{DS} = V _{DS} = V _{DS} = V _{DS} = V _{DS} = V _{DS} = (1)	= 10V, I _D = 37.5A = 25V, V _{GS} = 0V MHz = 50V, I _D = 75A = 10V, R _{GEN} = 25Ω	(Note 4)	· · · · ·	100 6185 585 235 107 322 166 149 89	- 8225 775 355 224 655 342 309 116	S pF pF pF ns ns ns ns ns
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$\begin{array}{c} & R_{DS(on)} \\ \hline g_{FS} \\ \hline \textbf{Dynamic} \\ \hline \textbf{O}_{iss} \\ \hline \textbf{C}_{oss} \\ \hline \textbf{C}_{rss} \\ \hline \textbf{C}_{rss} \\ \hline \textbf{Switching} \\ \hline \textbf{t}_{d(on)} \\ \hline \textbf{t}_{r} \\ \hline \textbf{t}_{d(off)} \\ \hline \textbf{t}_{f} \\ \hline \textbf{Q}_{g(tot)} \\ \hline \textbf{Q}_{gs} \\ \hline \textbf{Q}_{gd} \\ \hline \textbf{Drain-Sou} \\ \hline \textbf{I}_{S} \\ \hline \textbf{I}_{SM} \\ \hline \end{array}$	Static E Forwar Characte Output Reverse Characce Gatero Turn-Or Turn-Or Turn-Of Turn-Of Turn-Of Turn-Of Turn-Of Turn-Of Gate to Gate to Urce Dioo	d Transconductance eristics apacitance Capacitance e Transfer Capacitanc teristics n Delay Time f Delay Time f Delay Time f Fall Time ate Charge at 10V Source Gate Charge Drain "Miller" Charge de Characteristic m Continuous Drain to	e S S So Source Dic urce Diode F	V _{DS} f = 11 V _{DD} V _{GS} V _{GS} V _{GS} V _{GS}	= 10V, I_D = 37.5A = 25V, V_{GS} = 0V MHz = 50V, I_D = 75A = 10V, R_{GEN} = 25 Ω = 50V, I_D = 75A = 10V rard Current Current		· · · · · · · ·	100 6185 585 235 107 322 166 149 89 37 22 -	- 8225 775 355 224 655 342 309 116 - - 75	S pF pF pF ns ns ns nC nC A
$\begin{array}{c} & R_{DS(on)} \\ \hline g_{FS} \\ \hline Dynamic \\ \hline C_{iss} \\ \hline C_{oss} \\ \hline C_{rss} \\ \hline C_{rss} \\ \hline Switching \\ \hline t_{d(on)} \\ \hline t_r \\ \hline t_{d(off)} \\ \hline t_f \\ \hline Q_{g(tot)} \\ \hline Q_{gs} \\ \hline Q_{gd} \\ \hline \end{array}$	Static E Forwar Characte Output Reverse Characce Turn-Or Turn-Or Turn-Of Turn-Of Turn-Of Turn-Of Turn-Of Turn-Of Characce Gate to Gate to Gate to Maximu Maximu Drain to	d Transconductance eristics apacitance Capacitance e Transfer Capacitance e Transfer Capacitance teristics n Delay Time f Delay Time f Delay Time f Fall Time ate Charge at 10V Source Gate Charge Drain "Miller" Charge de Characteristic m Continuous Drain to m Pulsed Drain to Source	e S S So Source Dic urce Diode F	V _{DS} f = 11 V _{DD} V _{GS} V _{GS} V _{GS} V _{GS} V _{GS} V _{GS}	= 10V, I_D = 37.5A = 25V, V_{GS} = 0V MHz = 50V, I_D = 75A = 10V, R_{GEN} = 25 Ω = 50V, I_D = 75A = 10V		· · · · · ·	100 6185 585 235 107 322 166 149 89 37 22 - -	- 8225 775 355 224 655 342 309 116 - - 75 300	PF pF pF ns ns ns nC nC A A

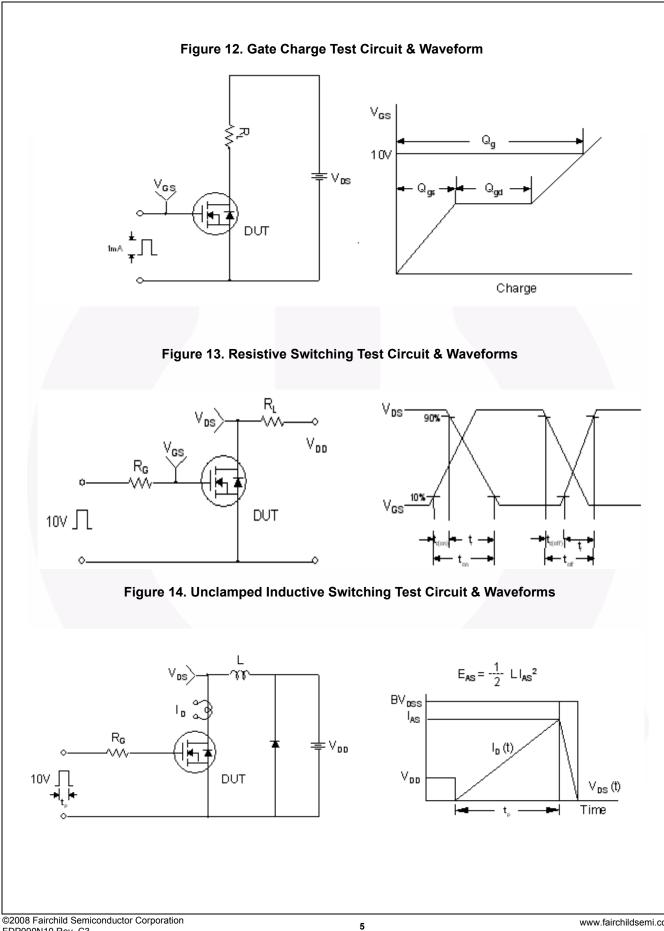
4: Essentially Independent of Operating Temperature Typical Characteristics

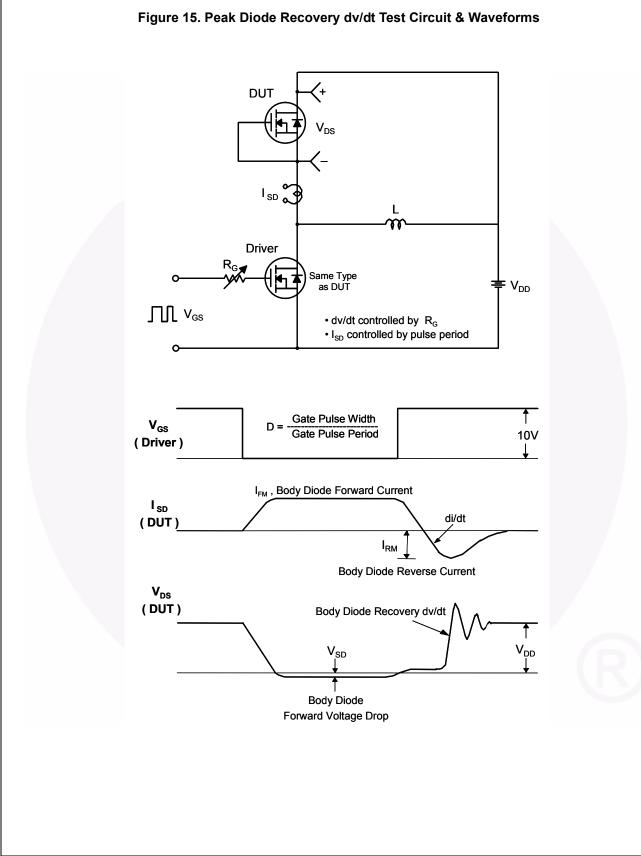
FDP090N10— N-Channel PowerTrench[®] MOSFET

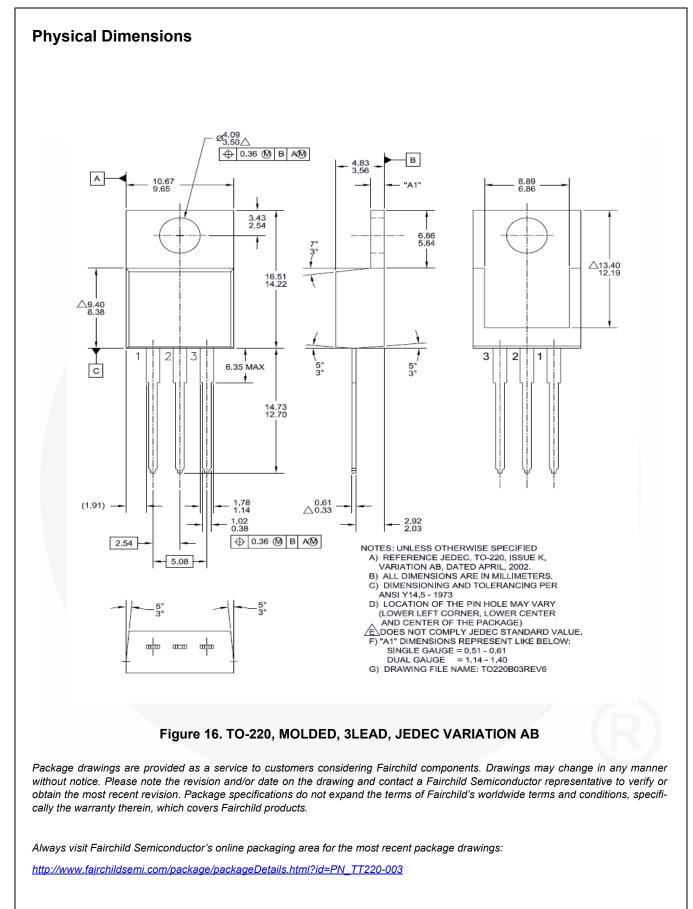


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-	Formative / In Design First Production Full Production		